|  |
| --- |
| ToR TTF T012 (Ref. Body ISG MEC) |
| Version: 0.8 |
| Author: ETSI (MCA) – Date: 2020-07-15 |
| Last updated by: ETSI Secretariat – Date: 2021-02-16 |
| page 1 of  |

Terms of Reference –Testing Task Force Proposal

TTF T012 (Ref. Body ISG MEC)

Maintenance and development of MEC APIs conformance test suites

Summary information

|  |  |  |
| --- | --- | --- |
| Approval status | Approved by Ref. Body (doc ref: MEC(20)000454r1) | **YES** |
| Reference Body | Ref. Body ISG MEC |
| ETSI Funding | **Maximum budget : 60 000 EUR** |
| Minimum of 4 ETSI Members Support | **YES** |
| Time scale | **From** | 2021-03-22 |
| **To** | 2021-11-30 |
| Work Items  | - RGS/MEC-DEC32-2v311ApiTest- RGS/MEC-DEC32-3v311ApiTest |
| TTF Roadmap reference |  |

Part I –TTF Technical Proposal

# Rationale & Objectives

## Rationale

The MEC standards have been designed to facilitate interoperability in a multi-vendor, multi-network and multi-service environment. As a first step all the MEC standards need to be validated and MEC products need to ensure that compliance with MEC base specifications is met.

In particular, the MEC APIs specified by ETSI MEC ISG are the heart of the MEC standards and enable interoperability and portability of MEC applications among deployment types, vendor solutions and operation domains. Conformance to the protocols is the fundamental to enable interoperability.

ISG MEC is contributing great efforts in making the MEC APIs fit and available to the industry: the availability of machine readable descriptions for the protocols (using the OpenAPI and Protobuf description formats), making available the MEC Sandbox and leading the MEC PoCs and MDTs campaigns.

Having an up to date, complete and easily accessible conformance test suite is essential to support applications and system developers.

Complementary to the availability of the MEC Sandbox to learn and experiment with the logic of the MEC APIs, the MEC API Conformance test suites provide syntactical and protocol-level correctness, thus providing solid ground to foster the ecosystem.

## Objectives of the work to be executed

## A set of API conformance test suites has been developed in 2019 and 2020 by ISG MEC as part of WIs MEC-DEC 032-1, 032-2 and 032-3.

The test suites have been successfully validated during the MEC Plugtests and in the validation activity within STF 569 workplan.

## As base specifications are updated and new APIs are added, the objective of the work proposed is mainly two-fold. First, maintain and update the currently available test suites. This consists in:

* Update the test suites when new versions of the specification are available,
* Implement fixes and improvements, collecting feedback from users and reported issues.

Second, develop test suites for new specifications and specifications that were not in scope of previous work, or not available for testing.

The activity should be executed between March and November 2021.

## Previous funded activities in the same domain

### Specialist Task Force 587: MEC Sandbox Scenarios and Interface Development

<https://portal.etsi.org/STF/STFs/STF-HomePages/STF587>

STF587 is developing the first version of the MEC Sandbox, with its final delivery in December 2020.

The results will include:

* Macro Network Scenario configurations set in Monaco for 4G and 5G
* MEC Sandbox web-portal user interface
* Sandbox backend realized via the AdvantEDGE open source edge emulator (<https://github.com/InterDigitalInc/AdvantEDGE>)
* Implementations of MEC Services, including MEC-012, MEC-013, and MEC-028 (depending on OpenAPI availability)

### Specialist Task Force 551: MEC Testing Framework

<https://portal.etsi.org/STF/STFs/STFHomePages/STF551>

The MEC Testing Framework defines a methodology for development of interoperability and conformance test strategies, test systems and the resulting test specifications for MEC standards. The MEC Testing Framework has been published and is available at:

<https://www.etsi.org/deliver/etsi_gr/MEC-DEC/001_099/025/02.01.01_60/gr_MEC-DEC025v020101p.pdf>

### Specialist Task Force 569: MEC API Conformance Test Specifications

<https://portal.etsi.org/STF/STFs/STFHomePages/STF569>

MECDEC-032, part 1, v2.1.1: Test Requirements and Implementation Conformance statements (ICS)

Stable draft: <https://docbox.etsi.org/ISG/MEC/Open/>

MECDEC-032, part 2, v2.1.1: Test Suite Structure and Test Purposes (TSS&TP) written in TDL-TO

Stable draft: <https://docbox.etsi.org/ISG/MEC/Open/>

MECDEC-032, part 3, v2.1.1: Test Scripts developed into Abstract Test Suites (ATS)

Stable draft: <https://forge.etsi.org/rep/mec/gs032p3-robot-test-suite> & <https://forge.etsi.org/rep/mec/gs032p3-ttcn-test-suite>

The resulting set of specifications enables testing activities in the many industrial contexts and segments where MEC technology is relevant. In order to have reached this objective, best practices and tools from both the Telecommunication and IT communities have been applied. The output contains Tests Scripts in both TTCN-3 and Robot Framework languages. Collaboration with the Edge Task Force within the GCF is already at a mature state, which it is anticipated will lead to the establishment of an MEC API focused certification programme.

## Consequences if not agreed

MEC equipment is currently being deployed in experimental trials with the progression towards fully operational deployment. Thorough conformance testing will increase the level of confidence that equipment from various suppliers will interoperate. This in turn will reduce implementation and rollout times. Not providing timely validated and reliable test specifications, would ultimately delay the deployment of MEC APIs and services.

Moreover, adoption of MEC APIs on behalf of Open Source Projects, while most welcome and key to a broad deployment of MEC systems, may lead to fragmentation in the implementations and “dialects” in the protocols utilized.

# ETSI Members Support

|  |  |  |
| --- | --- | --- |
| **#** | **ETSI Member** | **Supporting delegate** |
| 1 | Hewlett-Packard Enterprise | Alex Reznik |
| 2 | InterDigital, Inc. | Robert Gazda |
| 3 | ZTE Corporation | Lijuan Chen |
| 4 | Huawei Technologies France | Alice Li |
| 5 | Intel Corporation (UK) Ltd | Dario Sabella |
| 6 | Samsung R&D Institute UK | Walter Featherstone |

# Deliverables

## Base documents

|  |  |  |
| --- | --- | --- |
| **Document** | **Title** | **Status** |
| ETSI GS MEC 002 2.1.1 | Multi-access Edge Computing (MEC);Use Cases and Requirements | Published |
| ETSI GS MEC 003 2.2.1 | Multi-access Edge Computing (MEC);Framework and Reference Architecture | Published |
| ETSI GS MEC 009 2.2.1 | Multi-access Edge Computing (MEC); General principles for MEC Service APIs | Published |
| ETSI GS MEC 010-2 2.2.1 | Multi-access Edge Computing (MEC); MEC Management; Part 2: Application lifecycle, rules and requirements management | Published |
| ETSI GS MEC 011 2.2.1 | Multi-access Edge Computing (MEC);Edge Platform Application Enablement | Published |
| ETSI GS MEC 012 2.1.1 | Multi-access Edge Computing (MEC);Radio Network Information API | Published |
| ETSI GS MEC 013 2.1.1 | Multi-access Edge Computing (MEC);Location API | Published |
| ETSI GS MEC 014 2.1.1 | Mobile Edge Computing (MEC);UE Identity API | To be published |
| ETSI GS MEC 015 2.1.1 | Mobile Edge Computing (MEC);Bandwidth Management and Multi-access Traffic Steering service | Published |
| ETSI GS MEC 016 2.2.1 | Mobile Edge Computing (MEC);UE Application API | Published |
| ETSI GS MEC 021 2.1.1 | Multi-access Edge Computing (MEC); MEC Application Mobility Service API | Published |
| ETSI GS MEC 028 2.2.1 | Multi-access Edge Computing (MEC);WLAN Information API | To be published |
| ETSI GS MEC 029 2.1.1 | Multi-access Edge Computing (MEC);Fixed Access Information API | Published |
| ETSI GS MEC 030 2.1.1 | Multi-access Edge Computing (MEC);MEC V2X API | Published |
| ETSI GR MEC-025 2.1.1 | Multi-access Edge Computing (MEC); MEC Testing Framework | Published |
| DGS/MEC-DEC32-1APIConformance 2.1.1. | Multi-access Edge Computing (MEC); API Conformance Test Specification Part 1: Test Requirements and Implementation Conformance Statement (ICS) | Published  |
| DGS/MEC-DEC32-1APIConformance 3.3.1. | Multi-access Edge Computing (MEC); API Conformance Test Specification Part 1: Test Requirements and Implementation Conformance Statement (ICS) | Early Draft |
| DGS/MEC-DEC32-2APIConformance 2.1.1 | Multi-access Edge Computing (MEC); API Conformance Test Specification Part 2: Test Purposes (TP) | Published  |
| DGS/MEC-DEC32-3APIConformance 2.1.1 | Multi-access Edge Computing (MEC); API Conformance Test Specification; Part 3: Abstract Test Suite (ATS) | Published  |

NOTE 1: The status of “To be published” indicates the MEC GS will be published in time to be considered in this TTF.

## New deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliv.** | **Work Item code****Standard number** | **Working title** | **Expected date for publication** |
| D1 | RGS/MEC-DEC32-2v311ApiTest | Multi-access Edge Computing (MEC); API Conformance Test Specification Part 2: Test Purposes (TP) | Dec 2021 |
| D2 | RGS/MEC-DEC32-3v311ApiTest | Multi-access Edge Computing (MEC); API Conformance Test Specification; Part 3: Abstract Test Suite (ATS) | Dec 2021 |

# Maximum budget

## Task summary/Manpower Budget

|  |  |
| --- | --- |
| **Task short description** | Budget (EUR) |
|
| Test Suite Development | 27000 |
| Test System Development | 13000 |
| Test System Validation | 13000 |
| **TOTAL** | 53000 |

## Travel budget

Maximum travel budget is estimated at 7000 Eur, allocated to support organization of working sessions at ETSI and to attend ISG meetings.

## Other budget line

NA.

Part II – Details on TTF Technical Proposal

# Tasks, Technical Bodies and other stakeholders

## Organization of the work

The team is expected to work remotely and in presence, autonomously and by organizing recurrent team meetings. Weekly status update meetings are recommended.

Contributions to the target deliverables are to be submitted to MEC DECODE meetings for acceptance, according to the working procedures of ISG MEC.

The developed test purposes and test cases are expected to be developed and made available using ETSI Forge, according to the applicable working procedure and following the conventions used in previous activities, notably by ETSI STF 569.

A Steering Group will be formed to guide the work and to provide feedback. The SG will meet at least monthly or more often if required. Interested delegates from ISG MEC will compose the SG.

## Other interested ETSI Technical Bodies

* ETSI ISG NFV – for dissemination
* ETSI TC MTS – for dissemination and consultation

## Other stakeholders

* 5GAA (5G Automotive Association) – for dissemination
* Global Certification Forum (GCF) – for dissemination
* GSMA OPG – for dissemination

Part III: Execution of Work

# Work plan, time scale and resources

## Task description

|  |  |
| --- | --- |
| **Task 0** | **Project management** |
| **Objectives** | Plan the work of the TTF members, ensuring that the timescales of the TTF deliverables are met |
| **Input** | 1. NA
 |
| **Output** | 1. Report to ISG MEC and MEC DECODE WG as appropriate on the work of the TTF
2. Draft progress report and final report as required
 |
| **Interactions** | Attending ISG, WG and TTF meetings, presentation of the TTF activity |
| **Resources required** | * Project management and team leadership
* Communication skills
 |

|  |  |
| --- | --- |
| **Task 1** | **Test Purposes development for MEC 028v211 and MEC 030v211** |
| **Objectives** | Develop, document, and contribute test purposes for the target APIs. |
| **Input** | * ETSI GS MEC 028v211
* ETSI GS MEC 030v211
* ETSI GS MEC-DEC 032-1v311
* OpenApi definitions for the target APIs
 |
| **Output** | * Test purposes available at ETSI Forge in TDL-TO format
* Tabular description of test purposes contributed and approved to the target deliverables
 |
| **Interactions** | * Approval of contributed Test Purposes by MEC DECODE WG
* Consultation with Steering Group
 |
| **Resources required** | * Expertise in test purpose development and documentation
* Expertise in TDL-TO
 |

|  |  |
| --- | --- |
| **Task 2** | **Test Purposes development for MEC 015v211 and MEC 016v211** |
| **Objectives** | Develop, document, and contribute test purposes for the target APIs. |
| **Input** | * ETSI GS MEC 015v211
* ETSI GS MEC 016v211
* ETSI GS MEC-DEC 032-1v311
* OpenApi definitions for the target APIs
 |
| **Output** | * Test purposes available at ETSI Forge in TDL-TO format
* Tabular description of test purposes contributed and approved to the target deliverables
 |
| **Interactions** | * Approval of contributed Test Purposes by MEC DECODE WG
* Consultation with Steering Group
 |
| **Resources required** | * Expertise in test purpose development and documentation
* Expertise in TDL-TO
 |

|  |  |
| --- | --- |
| **Task 3** | **Test Cases development for MEC 028v211 and MEC 030v211** |
| **Objectives** | Develop, document, validate contribute test cases for the target APIs in TTCN-3 and Robot Framework languages. |
| **Input** | * ETSI GS MEC 028v211
* ETSI GS MEC 030v211
* ETSI GS MEC-DEC 032-1v311
* Developed Test Purposes from Task 1
* OpenApi definitions for the target APIs
 |
| **Output** | * Test cases available at ETSI Forge in TTCN-3 and Robot Framework format
* Contribution linking to the developed Test Cases approved by MEC DECODE WG
* Report on the validation of the test cases
 |
| **Interactions** | * Review Approval of contributed Test Purposes by MEC DECODE WG
* Consultation with Steering Group
 |
| **Resources required** | * Expertise in test case development and documentation
* Expertise in TTCN-3 and Robot Framework
 |

|  |  |
| --- | --- |
| **Task 4** | **Test Cases development for MEC 015v211 and MEC 016v211** |
| **Objectives** | Develop, document, validate contribute test cases for the target APIs in TTCN-3 and Robot Framework languages. |
| **Input** | * ETSI GS MEC 015v211
* ETSI GS MEC 016v211
* ETSI GS MEC-DEC 032-1v311
* Develop Test Purposes from Task 2
* OpenApi definitions for the target APIs
 |
| **Output** | * Test cases available at ETSI Forge in TTCN-3 and Robot Framework format
* Contribution linking to the developed Test Cases approved by MEC DECODE WG
* Report on the validation of the test cases
 |
| **Interactions** | * Review Approval of contributed Test Purposes by MEC DECODE WG
* Consultation with Steering Group
 |
| **Resources required** | * Expertise in test case development and documentation
* Expertise in TTCN-3 and Robot Framework
 |

|  |  |
| --- | --- |
| **Task 5** | **Test Purposes maintenance and updates for MEC 010-2v221, MEC 011v221 and MEC 028v221** |
| **Objectives** | Review, update, document, and contribute test purposes for the target APIs. |
| **Input** | * ETSI GS MEC 010-2v221
* ETSI GS MEC 011v221
* ETSI GS MEC 028v221
* ETSI GS MEC-DEC 032-1v311
* OpenApi definitions for the target APIs
 |
| **Output** | * Test purposes available at ETSI Forge in TDL-TO format
* Tabular description of test purposes contributed and approved to the target deliverables
 |
| **Interactions** | * Approval of contributed Test Purposes by MEC DECODE WG
* Consultation with Steering Group
 |
| **Resources required** | * Expertise in test purpose development and documentation
* Expertise in TDL-TO
 |

|  |  |
| --- | --- |
| **Task 6** | **Test Cases development for MEC 010-2v221, MEC 011v221 and MEC 028 v221** |
| **Objectives** | Develop, document, validate contribute test cases for the target APIs in TTCN-3 and Robot Framework languages. |
| **Input** | * ETSI GS MEC 010-2v221
* ETSI GS MEC 011v221
* ETSI GS MEC 028v221
* ETSI GS MEC-DEC 032-1v311
* Develop Test Purposes from Task 5
* OpenApi definitions for the target APIs
 |
| **Output** | * Test cases available at ETSI Forge in TTCN-3 and Robot Framework format
* Contribution linking to the developed Test Cases approved by MEC DECODE WG
* Report on the validation of the test cases
 |
| **Interactions** | * Review Approval of contributed Test Purposes by MEC DECODE WG
* Consultation with Steering Group
 |
| **Resources required** | * Expertise in test case development and documentation
* Expertise in TTCN-3 and Robot Framework
 |

|  |  |
| --- | --- |
| **Task 7** | **Maintaining and revising the Test Purposes and Test Suites** |
| **Objectives** | Review, fix, improve the test purposes and test cases based on reported issues. |
| **Input** | * Base documents
* Issues reported to MEC workspace on ETSI Forge: <https://forge.etsi.org/rep/groups/mec/-/issues>
 |
| **Output** | * Report on the maintenance activities execute, on the ETSI Forge issue tracker and summarized to MEC DECODE WG
 |
| **Interactions** | * Consultation with Steering Group
* Interaction with reporters of issues and users of the test specifications
 |
| **Resources required** | * Expertise in test case development and documentation
* Expertise in TTCN-3 and Robot Framework
 |

## Milestones

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **A** | Contributions available with Draft of TP and TC for MEC 028v211 and MEC 030v211, MEC 015v211 and MEC 016v211.Report on maintenance progress | 2021-05-15 |
| Reference Body Deliverable | Early Draft available to MEC ISG DECODE WG |
| ETSI Deliverable | Progress Report approved by MEC ISG DECODE WG |

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **B** | Contributions approved with TP and TC for MEC 028v211 and MEC 030v211, MEC 015v211 and MEC 016v211 Report on maintenance progress | 2021-09-30 |
| Reference Body Deliverable | Early Draft available to MEC ISG DECODE WG. |
| ETSI Deliverable | Progress Report approved by MEC ISG DECODE WG. |

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **C** | Contributions available with Draft of TP and TC for MEC 010-2v221, MEC 011v221 and MEC 028v221Report on maintenance progress | 2021-07-31 |
| Reference Body Deliverable | Early/Stable Draft available to MEC ISG DECODE WG |
| ETSI Deliverable | Progress Report approved by MEC ISG DECODE WG. |

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **D** | Contributions approved with TP and TC for MEC 010-2v221, MEC 011v221 and MEC 028v221Report on maintenance progressComplete, final Deliverables approved | 2021-10-31 |
| Reference Body Deliverable | Final Draft Deliverables approved by MEC ISG. |
| ETSI Deliverable | Final Report approved by MEC ISG. |

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **E** | Deliverables published, TTF closed | 2021-11-30 |
| Reference Body Deliverable |  |
| ETSI Deliverable | Deliverables published, TTF closed |

## Task summary

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Task / Milestone**  | Target Date | Estimated Cost (EUR) |
| From | To |
|  | Start of work |  |  |  |
| T0 | Project management | 22/03/2021 | 30/11/2021 | 0 |
| T1 | Test Purposes development for MEC 028v211 and MEC 030v211 | 22/03/2021 | 15/04/2021 | 5000 |
| T2 | Test Purposes maintenance and updates for MEC 015v211 and MEC 016v211 | 16/04/2021 | 15/05/2021 | 5000 |
| T3 | Test Cases development for MEC 028v211 and MEC 030v211 | 22/03/2021 | 15/04/2021 | 6000 |
| T4 | Test Cases development for MEC 015 and MEC 016 | 16/04/2021 | 15/05/2021 | 6000 |
| Milestone A | Contributions available with Draft of TP and TC for MEC 028v211 and MEC 030v211, MEC 015v211 and MEC 016v211.Progress Report#1 approved by MEC ISG DECODE WG | 15/05/2021 |  |
| Milestone B | Contributions approved with TP and TC for MEC 028v211 and MEC 030v211, MEC 015v211 and MEC 016v211.Progress Report#2 approved by MEC ISG DECODE WG | 30/09/2021 |  |
| T5 | Test Purposes maintenance and updates for MEC 010-2v221, MEC 011v221 and MEC 028v221 | 01/06/2021 | 30/06/2021 | 8000 |
| T6 | Test Cases development for MEC 010-2v221, MEC 011v221 and MEC 028v221 | 01/07/2021 | 31/07/2021 | 8000 |
| MilestoneC | Contributions available withDraft of TP and TC for MEC 010-2v221, MEC 011v221 and MEC 028v221.Progress Report#3 approved by MEC ISG DECODE WG | 31/07/2021 |  |
| T7 | Maintaining and revising the Test Purposes and Test Suites | 22/03/2021 | 31/10/2021 | 15000 |
| MilestoneD | Contributions approved withTP and TC for MEC 010-2v221, MEC 011v221 and MEC 028v221.Complete, final Deliverables approvedFinal Report approved by MEC ISG. | 31/10/2021 |  |
| MilestoneE | Deliverables published, TTF closed | 30/11/2021 |  |
|  | **53000** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Task/ Mil.** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** |
| T0 |  |  |  |  |  |  |  |  |  |
| T1 |  |  |  |  |  |  |  |  |  |
| T2 |  |  |  |  |  |  |  |  |  |
| T3 |  |  |  |  |  |  |  |  |  |
| T4 |  |  |  |  |  |  |  |  |  |
| MA |  |  |  |  |  |  |  |  |  |
| MB |  |  |  |  |  |  |  |  |  |
| T5 |  |  |  |  |  |  |  |  |  |
| T6 |  |  |  |  |  |  |  |  |  |
| MC |  |  |  |  |  |  |  |  |  |
| T7 |  |  |  |  |  |  |  |  |  |
| MD |  |  |  |  |  |  |  |  |  |
| ME |  |  |  |  |  |  |  |  |  |

# Expertise required

## Team structure

Up to three contractors to ensure the following mix of skills:

|  |  |
| --- | --- |
| **Priority** | **Qualifications and competences** |
| High | Expert knowledge of all base standards mentioned above in clause 6.1 |
| High | Proven experience in conformance testing |
| High | Expertise in TTCN-3, development workflow and tooling* expert knowledge of TTCN-3 (ES 201 873);
* expert knowledge in codec and adaptation layer development in C++/Java
 |
| High | Expertise in the Robot Framework language, development workflow and tooling |
| High | Expertise in software development best practices, including Content Version Management using GIT |

Part IV: TTF performance evaluation criteria

# Performance Indicators

Contribution from ETSI Members to STF work

* Monthly Steering Committee meetings
* Contributions/comments received from the reference ISG

Contribution from the STF to ETSI work

* Contributions to ETSI Forge and DECODE WG meetings throughout 2021
* Presentations in workshops, conferences, stakeholder meetings

Liaison with other stakeholders

* Comments received on tests
* Propose resolution to comments received on the DECODE WG mailing list and implement and approve the resolutions in the GSs and Forge

Quality of deliverables

* Approval of deliverables according to schedule
* Respect of time scale, with reference to start/end dates in the approved ToR
* Comments from quality review by ISG
* Comments from quality review by ETSI Secretariat

Time recording

For reporting purposes, the TTF experts shall fill in the timesheet provided by ETSI with the days spent for the performance of the services

During the activity, the TTF Leader shall collect the relevant information, as necessary to measure the performance indicators. The result will be presented in the Final Report.

# Document history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 0.1 | 2020-07-16 | ETSI (MCA) | Initial draft | Initial draft |
| 0.2  | 2020-07-16 | ETSI (MCA) | Submitted for RC | Editorial fixes following review at MEC-DECODE#003-Tech |
| 0.3 | 2020-07-30 | Walter Featherstone (Samsung) & Ulrich Kleber (Huawei) | For approval | Limits the scope of the TTF to MEC-032 part 2 & 3 |
| 0.4 | 2020-07-30 | Walter Featherstone (Samsung) | Approved within WG DECODE  | Added DGS/MEC-DEC32-1APIConformance 3.1.1 as a base document (clause 3.1) following review at MEC-DECODE#004-Tech. |
| 0.5 | 2020-09-09 | Ultan Mulligan (ETSI) | For approval | Editorial update before Board#129 |
| 0.6  | 2020-12-15 | ETSI (MCA) & Walter Featherstone (Samsung) | For ISG approval | Completion of part II – IV  |
| 0.7 | 2021-02-10 | U Mulligan (ETSI) |  | Added milestone E, updated status of base documents, clarified milestone descriptions |
| 0.8 | 2021-02-16 | ETSI Secretariat | Board Approved | Update before CL publication |